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Systematic Review

Musculoskeletal Disorders Risk Factors among Faculty Members of Academic Institute

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ABSTRACT

Musculoskeletal disorders in adult population have been a rapidly expanding issue. It has been determined that teachers in educational institutions are one profession that is susceptible to musculoskeletal disorders. Even while MSDs among occupational groups have been extensively researched in other nations, Pakistan currently lacks solid information on this health issue, notably in the teaching profession. Work-related MSDs may result from the demands of this work, which involve daily, continuous stress on the body's muscular systems over the course of at least a year. So, this study is to identify papers that looked into instructor complaints of pain in lower back, shoulder and neck and other body areas. In this way, the objective of this review is likely to explore the works fundamentally and account on the incidence of MSDs as well as the risk factors relating to the job of educator. Any felt pain or discomfort from the nine body regions neck, shoulders, upper back, lower back, elbows, wrists/hands, hips/thighs, knees, and ankles/feet lasting for more than one day over the course of the previous 12 months was defined as the prevalence of MSDs which is growing rapidly all around the world.

INTRODUCTION

A 'mother of all professions' is the perfect statement to describe teaching profession although it is the most stressful and challenging also. MSDs are regarded as ailments that are chronic and degenerative that affect tendons, muscles, ligaments, and other structures [1]. Musculoskeletal disorders (MSDs) are prevalent in many occupational areas, including education, and pose a serious risk to public health in both developed and developing nations [2]. A teacher is someone who imparts attentiveness on youngsters, especially during their formative years. Instructors provide knowledge and morals to students, set them up for later schooling and the workforce, and primarily contribute to a decent education [3]. Teachers work really hard to educate our students, but certain work-related health problems have gone unreported. The issue is that musculoskeletal disorders. There are many incidences of disorder among instructors [4]. The primary cause of illness and reduced productivity is musculoskeletal discomfort. As a result, it has an impact on the quality of life of the individual as well as the health care system, the productivity of their institution, and the overall productivity of the nation. In wealthy nations, 47% to

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85% of academic staff members report having musculoskeletal pain. However, there weren't many research conducted in underdeveloped nations, especially in the study area[5]. The rapid increase of musculoskeletal disorders (MSDs) worldwide is characterized by the occurrence of pain or discomfort lasting over a day in the preceding 12 months in any of the nine body regions: neck, shoulders, upper back, lower back, elbows, wrists/hands, hips/thighs, and knees/ankles [6]. Researching, developing, and conducting an educational approach in a learning environment are all parts of a teacher's job to help students develop and accomplish their intellectual potential[7]. Employed in the similar situation for extended aeras of time, bending and twisting your back awkwardly, and continuing to work despite being ill or injured are all significant work-related risk factors for MSDs [8]. A growing number of Asian countries are dealing with the frequency and harmful impacts of MSDs among workers in various occupational areas, particularly in the education sector, as a result of the difficulties associated with economic growth.[9] Although the impact of MSDs on teaching output in developing nations is hazy and frequently unquantified, numerous studies have shown that MSDs cause poor health at retirement age in many occupations, including teaching, in affluent nation [10]. Instructors frequently employ a head-down posture while reading and reviewing student projects on laptops [11]. As WHO said, workers all over the world suffer from work-related MSDs (WMSDs) due to multiple risk factors. MSDs make up a sizable component related to global ailment weight and consume significant pecuniary ramifications. It is said to remain a significant issue in the occupied industries, with lumbar and shoulder conditions actuality the utmost prevalent and expensive conditions [12]. Furthermore, it is well recognized that the cause of MSDs is incorporating multiple factors and a complicated interplay between biomechanical strain, personal genetics, and environmental influences, including organizational, behavioral, and work environment), and the psychosocial environment [9]. Numerous companies, including educational institutions, fail to adhere to the ergonomic principles outlined in regulation number 17 (Ergonomics), which establishes a set of guidelines for maintaining appropriate working conditions. Assumed the connection amid bad occupied circumstances, human locomotor problems, deprived psychological welfare, and poor eminence of lifecycle between educators, this topic assumes particular relevance [13]. These days, labor is inextricably linked to capitalist relationships, where employees are always expected to succeed in their roles and require ongoing training in their fields. Also, the structure of the workplace may hasten the development of difficulties in a worker's life, especially health-related ones. Musculoskeletal disorders (MSDs) have become more well-known in this setting because of the way they affect various aspects of people's lives and careers [14]. Also, due to health reports, compensation costs, and wage losses, it has been claimed that labor and economic loss associated with MSDs is higher than that associated with all other illness groups [15]. MSD are the most predominant vigor problem of the advancing years. A person's susceptibility to MSDs declines with age, and the enhanced severity and incidence of soft tissue damage are caused by the degradation of the tissues. Several MSD studies omit information on bustle stages and psychotropic hazards, remain acknowledged to be increasingly significant for lower back, neck and shoulder MSD [16]. Interventions to enhance organizational aspects of work include those directed at duty contented, teamwork, provision, exertion hop, and development, among other things. Methodological interpositions are also available, focusing on things like the working situation, salaried loftiness, and utensils and apparatus. Also, nearby initiatives targeting worker behavior, working conditions, education, and training[17].

METHODS

Through a methodical search, certain keywords were identified to find the relevant studies and data. The identification and categorization of MSD research and publications in the last 3 years has been carried out using electronic databases such springer, SAGE publications, science direct, google scholar, ELCOSH, PubMed. To gather the most recent work for review, researchers from the last three years are chosen. The following keywords and their combinations were looked up: school teachers, prevalence, risk factors of MSDs, musculoskeletal disorders, musculoskeletal disease, and musculoskeletal discomfort. Teachers with a malignant tumor, a physical disability, a previous surgery or an inflammatory joint disease, or who were pregnant or with any other medical or clinical condition is not included in any of the reviewed studies.

Selection of applicable revisions

All together 52 research labels in total were seen, of which 23 were discarded and 5 were identified as musculoskeletal disorders-related to mental health research. The duplicates were eliminated after carefully identifying the pertinent criteria. A total of 24 studies have been acknowledged, and the study's participants and setting can be analyzed in terms of examination, scheme, the measures, the prevalence and risk factors offered, as well as the conclusion. These articles included faculty from schools and universities as participants. All of the studies

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are carried out between 2019 and 2023. To ascertain the pervasiveness and jeopardy of human locomotor system between the teaching staff of schools and universities, the majority of these studies employed validated methodology, such as the Nordic Musculoskeletal Disorder, General Health Questionnaire for MSD's. Short-Form 36 Health Survey Instrument, Patient Health Questionnaire (PHQ-9), and (AVEM) for mental health.

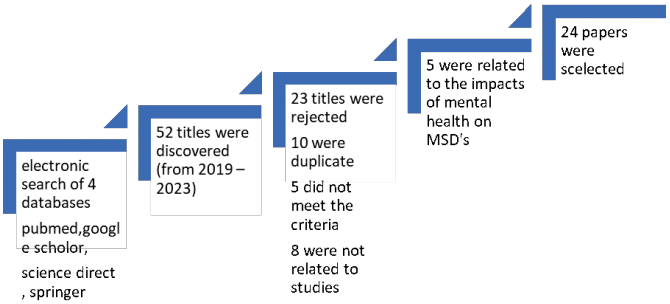

Figure 1: Overview of literature search [18]

Characteristics of study population

Musculoskeletal diseases (MSDs) are the highest universal communal well-being subject and a common reason for tardiness at work, according to previous studies [19]. According to academics with excess body weight had a 3.69 percent likelihood of developing MSP, which was 3.6 times higher than academics with normal body weight [20]. As a result, there will need to be an employment rate of over 70%. If we talk about MSD prevalence Perhaps because of the teachers' tremendous efforts to educate our children, the number of educators with MSD is rising, and this issue is frequently ignored [4]. In order to counteract the loss of individuals who are of working age, the percentage of reliant on fledgling and elderly individuals to persons of salaried age is expected to rise from approximately 49% in 2005 to 66% in 2030.Since the prevalence of MSDs often rises with age, the ageing population presents a unique issue in ergonomics. As a tricenarian majority has already gone through their prime incident of a occupational MSD, which typically manifests as back pain [16]. Although though it was long ignored, human locomotor system is utmost dominant and serious professional vigor complications in the profession of teaching that consumes recently drawn greater attention. There is a broad spectrum of degenerative and inflammatory conditions that affect the musculature, articulations, sinews, connective tissues, neural pathways, skeletal structure, and the localized vascular system included in MSD by definition. These conditions may be brought on by or made worse through exertion of tasks and the impact of the immediate work environment. Even though it's universally believed that schools are the prime spot for teachers to work, a literature appraisal shows the instructors remain at risk of problems related to MSD. Physical factors such as monotonous motions, stressful circumstances, and uncomfortable or still postures can cause MS disorders [3]. Constant discomfort in body systems like skeletal structure, neural pathways, sinews, articulations, connective tissues, and even the vascular system is one occupational risk factor that has been linked to work-related MSDs [6]. One of the most frequent complaints among instructors is pain in the muscles and tendons. The pervasiveness of illnesses related to MSD among secondary school teachers in the Philippines indicates that curriculum and policy makers, as well as other interested parties, should enhance the working conditions for teachers. The International Labor Organization (ILO) lists certain activities and environments as having a higher risk of MSDs, such as those that involve swift or monotonous motion, strenuous activity that is too intense in one area, concentrations of too much mechanical force, unpleasant or non-neutral postural control, and sensations [10].

Peril issues: (Discrete issues)

This information regarding conscience incidence of musculoskeletal symptoms and social and environmental hazard acquaintances by stage of development(age) and gender amid a population provided by [21]. Several bodily regions' MSDs have been linked to physical and psychosocial risk factors. Characteristics such as strong supervisor support, increased job control, and regular engagement in physical activity demonstrate a safeguarding effect against MSDs. Given the rapid proliferation of educational institutions across the nation and the subsequent rise in the number of teachers, the findings of this study hold considerable importance. Additionally, it will provide valuable insights into the prevention of musculoskeletal pain among teachers because it also seeks to identify the coping mechanisms frequently used by instructors to deal with this pain [22]. Low back pain was considered the greatest cause of activity limits and absence from work internationally, causing further comprehensive impairment than other medical conditions, particularly among the elderly population. It is reasonable to infer that the lecturers who participated in it may have missed days of work or lost man-hours due to their experience with WRMSDs [23]. However, according to previous studies in Putrajaya, Kuala lumpur, klang valley the majority of their respondents were between the ages of 31 and 49, which may have contributed to their complaints of MSD pain or discomfort. Teachers have MSDs owing to the extent of amenity in institution, regardless of the rank of faculty in any organization [18].

Physical factors

Changes in physiology including muscle tension, muscular exhaustion, and tissue distortion are commonly included in

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the scenario. The Karsh model also suggested that physical suffering of body parts was a direct result of the physical demands of the job. Overload, repetitive load, weariness, or changes in working methods made to accommodate the physical demands of the job are all possible explanations for how this transpires in addition ultimately contributes to the expansion of MSD's related to word [24]. The number of persons aged 65 and older will increase by 52.3% between 2005 and 2030, the population aged 15 to 64 will experience a decrease of 6.8% in numbers[21].The chapter written by [25] in his book explains the topic of musculoskeletal disorders of teaching professionals provided evidence that teachers, regardless of where they work, frequently suffer from MSDs. Teachers all across the world experience pain and suffering as a result of MSDs. For all MSDs, certain nations have prevalence rates that are higher than normal. MSDs can be brought on by both an extreme corporal load and extended, badly accomplished inactive job. Lack of physical exercise, work on computer, motionless heaps, uncomfortable or protracted positions, aberrant front to back imbalance in spine, extended sedentary and upright positions, obesity, and tobacco use are risk factors for MSDs [26]. According to speculations, MSDs will gradually become more prevalent, emerge into a "new epidemic," and constitute a medical condition that must be looked at and rectified in the occupational ailments category [15]. Primary prevention is strongly encouraged in order to reduce or eliminate MSD risk factors that are related to the workplace. In 2017 a six-step plan for establishing such preventive was developed. The primary 3 stages involve establishing the frequency and sternness of the ailment, the potential menace aspects, and the mechanisms that could result in an MSD. An intervention is produced in the fourth stage using the information from the previous processes. The evaluation and application of the presumed effective intervention are the topics of steps five and six [17]. A few studies among Malaysian teachers examining musculoskeletal illnesses have been conducted, reporting prevalence rates of more than 80% according to the pertinent literature on musculoskeletal disorders. Musculoskeletal issues and signs of discomfort or pain have been examined in recent studies as a serious health concern for school teachers. The data analysis also shows that as BMI rises throughout adulthood, the risk does too. Those who are obese have slightly more severe knee joint deterioration than those who are a healthy weight [24]. Research has found that physical characteristics and work-related musculoskeletal disorders are linked to MSDs among instructors in Kota Kinabalu, Sabah, and other industrialized nations, including turkey, Brazil, Greek, Thailand with heavy loads, excessive physical activity, improper furnishings, and poor posture linked to back discomfort. These findings are contributing to the development of MSDs in teaching profession [27, 28]. Obesity among educators has been discovered to be strongly linked to illnesses such as stiffness, particularly in the human knee joint. In conjunction with fewer coaching times and a work requirement that is less administratively demanding on instructors, appropriate amenities and physical activity can be thought of as ways to lower the frequency of MSDs among teachers. Regarding their job duties, instructors reported lifting objects with their hands 70.0% of the time, sitting for more than 4 hours per day 37.5% of the time, and standing for more than 2 hours per day 92.5% of the time during class hours [18].

Psychological Factors

In terms of mental health, MSD have been linked to high psychosocial demands, high levels of mental workplace stress and harassment, as well as emotions of sadness, anxiety, and unhappiness at work. The overall population's and working groups' Quality of Life (QoL) is severely impacted by each of these health issues [29]. Despite the fact that psychosocial factors were not demonstrated to have an impact on MSD in the current investigation, substantial relationships between workload, work-life balance, and overall well-being were discovered. The study's findings also showed that overall well-being was the biggest indication of musculoskeletal illness in addition to physical causes [28]. Owing to the high physical and mental demands of teaching, as well as a number of diseases connected to MSD, the teaching industry has reported a number of occupational illnesses. According to global data on teachers, the prevalence of these symptoms varies between 30 to 90% in this job group and is associated with different sociodemographic characteristics and specific health issues among teachers [29]. MSDs play a significant role in both a teacher's physical and mental health [30]. Stress mediates the affiliation among exertion environment and occupational MSD's. Therefore, it is crucial that teachers' work environment that increases stress should be enhanced to reduce work related musculoskeletal disorders [31]. The occurrence of musculoskeletal pain among female teachers in the Riyadh region of Saudi Arabia was notable, particularly among older individuals, those with a higher number of pregnancies, and those working at elementary schools. A noteworthy correlation was observed between the prevalence of musculoskeletal pain and the prevalence of depression, potentially impacting the teachers' work capacity and diminishing their effectiveness. Rendering to earlier research, chronic pain can negatively affect overall health, including mental health, and it frequently coexists with other conditions like anxiety and depression. Those who have chronic pain are more likely to experience

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depression, and vice versa [32]. The non-direct effect of the psychosocial component on MSD throughout despair was -0.069. Depression therefore served as a partial mediator since depression reduces the significant direct effect of psychosocial factors on MSD [18].

RESULTS AND DISCUSSION

Significant elevations in pain severity were observed among nurses working night shifts, particularly in the upper back, shoulders, lower back, knees, and ankles/feet. There was a substantial prevalence of musculoskeletal problems among teachers in Terengganu's primary schools (40.1%). Over the past 12 months, the prevalence rate reached 32.5%, while for the past 7 days, it stood at 36.8% the feet were the body component most Parallels between the results of the Botswana study and those findings show that instructors who claimed that their employment required a high level of physical effort, quick physical activity, an awkward physique, and an uncomfortable manner had a greater prevalence of MSD severely afflicted [27]. Teachers' exposure to peril aspects such phase, body mass index, athletic participation, shoe form, schooling hours, and upright time was examined. So, if no action is made to lower MSDs prevalence between educators, they are more likely to cause musculoskeletal disorders than existing results owing to substantial hazard. [3].In each of the age categories, ladies testified a considerably developed pervasiveness of upper body complaints than did males. Among all age categories, there was hardly any gender difference in lower back reports. The majority of symptoms were self-reported in the lower back (51%) shoulder (57%) and neck (58%) areas [16]. The study's findings, which include the fact that many teachers experienced musculoskeletal symptoms over the course of 7 days and 12 months, indicate that teachers of classes 9th through 12th are more vulnerable to WMSD because of the demands of their jobs. The survey also reveals that many of them had musculoskeletal problems that prevented them from performing their everyday activities. The body sections with the least damage were the Thigh, Buttocks, and Elbow area. The greatest impacted parts were the lower back and neck [7]. In our study, most commonly affected site with MSP was neck (48.5%) [8]. There was evidence of a significant global prevalence of musculoskeletal problems. Of the instructor responses, lower back, leg, and neck discomfort were listed as the most typical concerns. This study, one of the few MSDs studies conducted in the Philippines, can raise public awareness that, in addition to the usual health issues teachers experience, MSDs are a cause for concern [33]. In elementary school teachers, musculoskeletal discomfort was present 81.89% of the time. shoulders (14.24%) Lower back (16.41%), neck (14.55%), and were the most frequent areas (Abstracts of Scientifica 2022).We investigated the occurrence, pattern, and accompanying issues of musculoskeletal pain amongst female educators in this descriptive cross-sectional survey study. Among study participants, musculoskeletal pain was present 82.7% of the time [11]. According to the study's research, the overall prevalence of MSDs is 70.47%. The incidences of leg pain (LP), lower back pain (LBP), shoulder pain (SP), neck pain (NP), and upper back pain (UBP) occurred at rates of 32.5% and 36.8% within the last 12 months and the past 7 days, respectively in 65.2%, 18.9%, 11.7%, 3.2%, and 1.1% of cases [35]. WRMSDs in the, hips/buttocks (78.2%), upper back (78.7%) and low back (41.6%) knees (70.3%) were the most frequently reported. 66.3% of the academic staff members were most likely to suffer from work related musculoskeletal disorders based on evaluation of their workplace environment. The significance of suitable office equipment and an enhanced working environment for academic employees was emphasized [36]. According to the surveys conducted in Asia results are as follows provided evidence that teachers, regardless of where they work, frequently suffer from MSDs. Teachers all across the world experience pain and suffering as a result of MSDs. For all MSDs, certain nations have prevalence rates that are higher than normal. Several bodily regions' MSDs have been linked to physical and psychosocial risk factors. It has been demonstrated that factors such as strong support from supervisors, elevated level of control over job tasks, and consistent engagement in physical exercise contribute to a preventive effect on musculoskeletal disorders (MSDs). Eric *et al.*, explained in the chapter of the book written by Patience Erick and coauthors. The occurrence of musculoskeletal disorders (MSDs) varies between 21.1% and 93.7% in the region, with elevated prevalence rates observed among educators in China and Saudi Arabia [37]. On the other hand, lower prevalence rates of MSDs have been documented among primary school teachers in Malaysia and male secondary school teachers in Saudi Arabia. Furthermore, there is a higher prevalence of MSDs among females compared to males [38]. In Saudi Arabia, academicians were found to have yearly occurrence of MSD by 42.5%, according to the current study. The alteration between the involvement of different educators of different departments , varied population tally, and varying labor situations could be the reason why the current study finds lower prevalence and a shift in the ranking of the involvement of bodily areas when compared to earlier studies [39]. According to the research conducted by [40] the conclusion was made as: The regime reported by Saudi Arabia which is the Qasim regime, reported an increasing occurrence of pain caused by MSD among school

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instructors. The widely held of instructors viewed agony as incapacitating, which caused serious negative effects. The most uncomfortable areas when it comes to incapacitating pain were the back, shoulder, and neck [41]. The faculty members noted to consume increasing amount of stress, musculoskeletal illnesses (MSDs), and a significant decline in quality of life (QoL). The relationship between rural and urban teachers body compositions, musculoskeletal disorders and quality of life however, is little understood [29]. Also, this study found that rural teachers had significant rates of MSD in the lower back and neck both of which have been linked to teacher studies at high rates. According to this study, near by a significant frequency of musculoskeletal disorders among teachers in secondary school in Cameroon, having MSDs around the neck, lower back, and shoulders predominating. The study also described the preventive role played by PA in lowering the risk of MSDs. Primary MSDs prevention strategies must be put into place in order to protect teachers' wellness by enhancing working conditions and promoting physical activity and sports. When all factors are considered, they may be very beneficial for effectively preventing and managing MSDs in the education sector [43]. The lower back was identified as the body region most frequently impacted (48.2%), with the shoulder (40.2%) and knee (38.4%) following suit [44]. Our findings revealed that age, pregnancy history, and school type played crucial roles in determining the prevalence of MSDs, showing higher rates and greater severity among older individuals, those with multiple pregnancies, and those employed in elementary schools. These outcomes align with previous research studies [45]. Male secondary school teachers have a significant prevalence of musculoskeletal discomfort, which primarily affects the neck, shoulder, low back, and lower limbs. Pain is strongly correlated with having little control over one's work. Length of sleep, obesity, and extended standing are risk factors for musculoskeletal pain [46]. The shoulder, lower back, neck, and wrist are the most often impacted areas of the body by MSD among teachers. A increasing corpus of research demonstrates that the instructors' individual, physical, and psychosocial variables are strongly related to MSD [4]. The most frequently reported MSD was lower back pain, followed by diseases of the thoracic, neck and knees. The lumbar region and neck of the teachers were also observed to have high levels of discomfort severity. These results are consistent with earlier research on MSDs because numerous studies have shown that teachers most frequently experience lower back pain and/or neck pain [47]. Long periods of upright and inactive, strident ends on tables, using a touchpad of laptop instead of mouse, and an insufficient height of screen (The display's upper edge positioned below the level of the eyes) were the key ergonomic risk factors discovered [48]. Results indicated that now in order to reduce the stress placed on the musculoskeletal system of educators and the prevalence and progression of WRMSDs among them in addition to their negative effects, it is necessary to develop educational programs, plan, design, and implement efficient preventive and therapeutic strategies, and adhere to ergonomic rules. raising one's standard of living [49]. The present study's high incidence of pain and ergonomic risk factors underscore the need for adjustments in teachers' work practices and greater awareness of ergonomic hazards. These improvements, in addition to those addressed to teachers' employment conditions, might help minimize the incidence of musculoskeletal pain and its associated negative effects, such as disability, lowered quality of life, and poor educational outcomes [48]. Although they have little effect on mortality, disorders of MSD's are one of the foremost reasons of suffering and dysfunction in society. The most significant conclusion from the current study was that 64.9% of the teachers had MSDs in any region of their bodies. In order to sustain efficient and ongoing educational activities, it is necessary to protect the health of teachers who train the next generation. In light of this, it is vital to pinpoint their issues, consider how they operate, and take the appropriate action [50]. In numerous international research, teachers in educational institutions most frequently reported having back, neck, and upper limb musculoskeletal issues [51]. Research generally demonstrates that educators are more susceptible to musculoskeletal disorders (MSDs). Hence, the focus on the expanded use of ergonomic principles and interventional strategies while researching the topic of MSD and postural risk factors among teachers. Recommendations include frequent athletic activity as a safeguard for reducing and finally avoiding these disorders [52]. MSDs not only result in private anguish but also economic costs effecting directly and in directly in health maintenance and management and mislaid efficiency [53]. There were a few shortcomings that should be emphasized in this evaluation overall. Limitations of these research and their findings can be attributed to respondents' self-reported MSDs; these studies used several anonymous surveys to gather their data. Because respondents completed the questionnaire rather than a licensed doctor or other medical professional, recollection partiality after the self-written survey influenced the outcomes. The reason for this is that their knowledge would allow for a more accurate and clinically supported diagnosis in various medical situations and diseases. This literature review examines the relationship between risk factors and prevalence of MSDs, taking into account gender, age, and other variables. It is suggested

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that female teachers of age range between 20-35 have higher chances of being healthy than older teachers, making them a better candidate for further research explaining the difference of variables in different age groups.

CONCLUSIONS

The high prevalence of work-related musculoskeletal diseases (WMSDs) among faculty in the education sector highlights the urgent need for further research on the impact of ergonomics on their wellbeing. A significant number of faculty members suffer from MSDs in various anatomical areas, with women being particularly susceptible. This could be attributed to a lack of knowledge regarding ergonomics and poor posture. Given the potential negative consequences of MSDs, including absenteeism and frequent clinical consultations, effective preventative measures need to be developed. By increasing public understanding of risk factors, coping mechanisms, and the effects of MSDs, it may be possible to reduce the prevalence of these conditions among teachers.

Authors Contribution

Conceptualization: TG, AK
Methodology: SA,
Writing-review and editing: JA, AI, HA, MN
All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

The authors declare no conflicts of interest.

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